SÜTRON

User Manual

CP3Api Functions

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1 Important Notes

1.1 Symbols

The symbols in this manual are used to draw your attention on notes and dangers.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER
This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
This symbol together with the signal word NOTE and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

Reference to source of information
This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

1.2 Safety Notes

- Read this manual carefully before using the software. Keep this manual in a place where it is always accessible to all users.
- The user manual, in particular the safety notes, must be observed by all personnel working with the software and the programmed device.
- Observe the accident prevention rules and regulations that apply to the operating site.
- Installation and operation must only be carried out by qualified and trained personnel.

1.3 Intended Use

- The software has to be used for programming operating devices exclusively. Every other use is not permitted.

1.4 Target Group

All configuration and programming work in connection with the automation system must be performed by trained personnel only (e.g. qualified electricians, electrical engineers).

The configuration and programming personnel must be familiar with the safety concepts of automation technology.

2 CP3Api

The CP3Api functions can be used on operating devices with the operating system Windows CE 6.0.

2.1 Functions

2.1.1 Memory

uint CP3GetRemMemorySize (void)	
Description	Size of the complete RAM memory (NVRAM / SRAM)
Supported product lines	M Line S Line
Parameter	-
Return value	Success: Memory size in bytes Error: 0

void CP3GetRamSelection (PT_REM_RAM_SEL psNVSRam)	
Description	Size of the available RAM memory
Supported product lines	M Line S Line
Parameter	psNVSRam: Pointer to REM_RAM_SEL structure
Return value	-

RAM memory allocation:

REM_RAM_SEL	
dword dwRamSize	Total size of remanent memory in bytes
dword dwPLCRam	Size of the PLC RAM in percent
dword dwPLCSize	Size of the PLC RAM in bytes
dword dwVisuRam	Size of the Visu RAM in percent
dword dwVisuSize	Size of the Visu RAM in bytes
dword dwReservedRam	Size of the reserved RAM in percent
dword dwReservedSize	Size of the reserved RAM in bytes

uint CP3GetPLCDataPointer (uint* pSize)	
Description	Pointer to memory area for the PLC
Supported product lines	M Line S Line
Parameter	pSize: Uint pointer with size of allocated memory
Return value	Success: Start address of allocated PLC memory Error: NULL

uint* CP3GetVisuDataPointer (uint* pSize)	
Description	Pointer to memory area for the visualization
Supported product lines	M Line S Line
Parameter	pSize: Uint pointer with size of allocated memory
Return value	Success: Start address of allocated Visu memory Error: NULL

bool CP3FreeMemory (uint* pMem)	
Description	Release PLC / visualization memory (PLCDataPointer / VisuDataPointer)
Supported product lines	S Line
Parameter	pMem: Uint pointer to memory to be released
Return value	Success: TRUE Error: FALSE

2.1.2 Display

bool CP3SetBrightness (LPBYTE pbWriteData)	
Description	Set brightness: Valid range from 1 (dark) - 31 (bright). Registry will be saved.
Supported product lines	S Line M Line P Line
Parameter	pbWriteData: Byte pointer with new value
Return value	Success: TRUE Error: FALSE

bool CP3SetBrightnessNR (LPBYTE pbWriteData)	
Description	Set brightness: Valid range from 1 (dark) - 31 (bright). Registry will **not** be saved.
Supported product lines	S Line M Line P Line
Parameter	pbWriteData: Byte pointer with new value
Return value	Success: TRUE Error: FALSE

uint CP3GetBrightness (LPBYTE pbReadData)	
Description	Read brightness: Valid range from 1 (dark) - 31 (bright).
Supported product lines	S Line M Line P Line
Parameter	pbReadData: Byte pointer with read value
Return value	Success: TRUE Error: FALSE

void CP3OEMBacklight (bool bBackLight)	
Description	Switch backlight on / off
Supported product lines	S Line M Line P Line
Parameter	bBackLight: 0 = Off; 1 = On
Return value	-

bool CP3OEMGetColorDepth (PDWORD pdwColorDepth)	
Description	Read color depth in bpp
Supported product lines	S Line M Line P Line
Parameter	pdwColorDepth: Dword pointer with read value
Return value	Success: TRUE Error: FALSE

bool CP3OEMSetColorDepth (PDWORD pdwColorDepth)	
Description	Set color depth in bpp
Supported product lines	S Line M Line
Parameter	pdwColorDepth: Dword pointer with color depth
Return value	Success: TRUE Error: FALSE

bool CP3AlarmBrightness (BYTE State)	
Description	Set brightness in case of alarms
Supported product lines	S Line M Line
Parameter	State: 1 = Brightness is set to value 15 0 = Brightness is set to initial value
Return value	Success: TRUE Error: FALSE

bool CP3OEMChangeDisplayMode (DWORD displayOrientation)	
Description	Set display orientation (Restart required)
Supported product lines	S Line M Line P Line
Parameter	displayOrientation: Possible values are 0, 90, 180, 270
Return value	Success: TRUE Error: FALSE

uint CP3GetDisplayMode (PBYTE pbMode)	
Description	Read display orientation
Supported product lines	S Line M Line P Line
Parameter	pbMode: Pointer to current orientation (0, 90, 180, 270)
Return value	Success: TRUE Error: FALSE

2.1.3 Screensaver

bool CP3OEMGetUserIdle (PDWORD pdwIdleTime)	
Description	Gets user idle time (no user input)
Supported product lines	S Line M Line
Parameter	pdwIdleTime: Dword pointer on idle time
Return value	Success: TRUE Error: FALSE

bool CP3OEMResetUserIdle ( )	
Description	Set user idle time to 0
Supported product lines	S Line M Line
Parameter	-
Return value	Success: TRUE Error: FALSE

bool CP3OEMDimBacklight (bool active, dword time, dword value)	
Description	The backlight can be dimmed after an idle timeout of the user inputs
Supported product lines	S Line M Line
Parameter	active: 1 = Dimming enabled; 0 = Dimming disabled time: User idle timeout to dimm backlight value: Dimming to this value
Return value	Success: TRUE Error: FALSE

bool CP3OEMBacklightOff (bool active, dword time)	
Description	The backlight can be switched off after an idle timeout of the user inputs
Supported product lines	S Line M Line
Parameter	active: 1 = Dimming enabled; 0 = Dimming disabled time: Idle timeout of the user inputs until backlight is switched off
Return value	Success: TRUE Error: FALSE

bool CP3OEMScreensaver (bool active, dword time)	
Description	The screensaver can be activated after an idle time of the user inputs
Supported product lines	S Line M Line
Parameter	active: 1 = Screensaver enabled; 0 = Screensaver disabled time: Idle time of user inputs till screensaver gets active
Return value	Success: TRUE Error: FALSE

bool CP3OEMRetriggerScreensaver ( )	
Description	Reset screen saver time on initial value. Using after the call of CP3OEMDimBacklight / CP3OEMBacklightOff.
Supported product lines	S Line M Line
Parameter	-
Return value	Success: TRUE Error: FALSE

2.1.4 Central Processing Unit

uint CP3EnableInts (void)	
Description	Enable Interrupts
Supported product lines	S Line M Line P Line
Parameter	-
Return value	Always TRUE

uint CP3DisableInts (void)	
Description	Disable Interrupts
Supported product lines	S Line M Line P Line
Parameter	-
Return value	Always TRUE

void CP3OEMResetTerminal ( )	
Description	Restart operating device
Supported product lines	S Line M Line P Line
Parameter	-
Return value	-

bool CP3OEMRestoreDefaultRegistry ( )	
Description	Restore default registry
Supported product lines	S Line M Line P Line
Parameter	-
Return value	Success: TRUE Error: FALSE

bool CP3OEMInterruptInitialize (dword dwSysIntr, handle hHwIntEvent)	
Description	Calls kernel function InterruptInitialize
Supported product lines	M Line
Parameter	dwSysIntr: Interrupt number hHwIntEvent: Handle to event
Return value	Success: TRUE Error: FALSE

bool CP3OEMInterruptDone (dword dwSysIntr)	
Description	Calls kernel function InterruptDone
Supported product lines	M Line
Parameter	dwSysIntr: Interrupt number
Return value	Success: TRUE Error: FALSE

bool CP3OEMInterruptDisable (dword dwSysIntr)	
Description	Calls kernel function InterruptDisable
Supported product lines	M Line
Parameter	dwSysIntr: Interrupt number
Return value	Success: TRUE Error: FALSE

bool CP3OEMReleaseSysIntr (dword dwSysIntr)	
Description	Calls kernel function ReleaseSysIntr
Supported product lines	M Line
Parameter	dwSysIntr: Interrupt number
Return value	Success: TRUE Error: FALSE

2.1.5 Sound

void CP3Buzzer (ushort Buzzerstate)	
Description	Activate / deactivate beeper
Supported product lines	S Line M Line P Line
Parameter	Buzzerstate: 0 = Off; 1 = On
Return value	-

uint CP3SetHornState (byte State)	
Description	Activates / deactivates the beeper at maritime operating devices
Supported product lines	S Line M Line
Parameter	Buzzerstate: 0 = Off; 1 = On
Return value	Success: TRUE Error: FALSE

2.1.6 System

bool CP3BattLow (void)	
Description	Read battery state
Supported product lines	S Line M Line
Parameter	-
Return value	TRUE: Battery weak or not available FALSE: Battery OK

ushort CP3TempHigh (void)	
Description	Read CPU temperature
Supported product lines	M Line P Line
Parameter	-
Return value	Success: Temperature in degree centigrade Error: 0 or 1

ushort CP3VoltageHighLow (void)	
Description	Read input voltage
Supported product lines	M Line
Parameter	-
Return value	Success: Input voltage in volt Error: 0

uint CP3ReadKeySwitch (lpbyte pbReadData)	
Description	Read key switch (optional)
Supported product lines	S Line M Line
Parameter	pbReadData: Pointer to 1 byte; Possible values: 0x07: Reset 0x0E: Stop 0x0D: Run 0x0B: Prog
Return value	Always TRUE

bool CP3OEMGetMacAddress (pword pwMACAddress)	
Description	Read MAC Address
Supported product lines	S Line M Line P Line
Parameter	pwMACAddress: Pointer to word[3] array contains MAC
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetSerNumber (lpcwstr serNumber)	
Description	Read serial number
Supported product lines	S Line M Line P Line
Parameter	serNumber: Pointer to tchar[16] array contains serial number
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetSWBundleVersion (lpcwstr swBundleVersion, dword * BundleSize)	
Description	Read bundle version
Supported product lines	S Line M Line P Line
Parameter	swBundleVersion: Pointer to string buffer BundleSize: Pointer to buffer size. Contains the required size - in fault case (return value = False) - if the buffer is too small.
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetHWFWVersion (lpcwstr hwfwVersion, dword * HWFWSize)	
Description	Read firmware version
Supported product lines	S Line M Line P Line
Parameter	hwfwVersion: Pointer to string buffer HWFWSize: Pointer to buffer size. Contains the required size - in fault case (return value = False) - if the buffer is too small.
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetConfigBlockVersion (lpcwstr configBlockVerson)	
Description	Read config block version
Supported product lines	M Line
Parameter	configBlockVerson: Pointer to word[16] array contains version
Return value	Always TRUE

bool CP3OEMGetImageName (lpcwstr imageName, dword * nameSize)	
Description	Read name of the Windows CE image (including version)
Supported product lines	S Line M Line P Line
Parameter	imageName: Pointer to string buffer nameSize: Pointer to buffer size. Contains the required size - in fault case (return value = False) - if the buffer is too small.
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetDeviceName (lpcwstr deviceName)	
Description	Read device name
Supported product lines	S Line M Line P Line
Parameter	configBlockVerson: Pointer to tchar[16] array contains name
Return value	Always TRUE

bool CP3OEMGetTouchFlag (pword touchFlag)	
Description	Read touch flag
Supported product lines	S Line M Line
Parameter	touchFlag: Pointer to flag. 1 = Operating device has a touch 0 = Operating device does not have a touch
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetTouchType (pword pwTouchType)	
Description	Read touch type
Supported product lines	S Line
Parameter	pwTouchType: Pointer to type. 1 = External USB touch 0 = Internal touch
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetKeyFlag (pword pdwKeyFlag)	
Description	Read key flag
Supported product lines	M Line
Parameter	pdwKeyFlag: Pointer to flag. 1 = Operating device has keys 0 = Operating device does not have keys
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetProfinetFlag (pword pwProfinetFlag)	
Description	Read PROFINET flag
Supported product lines	M Line
Parameter	pwProfinetFlag: Pointer to flag. 1 = Operating device supports PROFINET 0 = Operating device does not support PROFINET
Return value	Always TRUE

bool CP3OEMGetFlashSize (pword pdwFlashSize)	
Description	Read flash size
Supported product lines	S Line M Line
Parameter	pdwFlashSize: Dword pointer contains flash size in byte
Return value	Success: TRUE Error: FALSE

uint CP3ReadIds (READIDS * psReadIds)	
Description	Read system IDs
Supported product lines	M Line S Line
Parameter	psReadIds: Pointer to READIDS structure
Return value	Always TRUE

READIDS	
uchar GruplaRev	-
uchar IBRev	-

READIDS	
uchar DisplId	Display IDs: 0xC 5,7" STN 0xB 5,7" TFT 0xA 10,4" TFT 0x9 5,7" Mono 0x8 3,8" Mono 0x7 160x80 Mono 0x6 3,8" Mono 0x5 5,7" Mono 0x4 7" TFT 0x3 3,5" TFT 0x2 12,1" TFT 0x1 15,1" TFT
uchar IbsId	-
uchar BatOk	0: Battery weak or not available 1: Battery OK

2.1.7 Watchdog

void CP3OEMSetWatchDog (bool bEnable)	
Description	Enable / disable watchdog
Supported product lines	S Line M Line P Line
Parameter	bEnable: 0 = Disabled; 1 = Enabled
Return value	-

void CP3OEMTriggerWatchDog ( )	
Description	Watchdog must at least be triggered once per second
Supported product lines	S Line M Line P Line
Parameter	-
Return value	-

2.1.8 In- / Outputs

uint CP3ReadIO (lpbyte pbReadData)	
Description	Read in- / outputs
Supported product lines	M Line
Parameter	pbReadData: Pointer to 1 Byte. Each bit corresponds to one in- / output.
Return value	Always TRUE

uint CP3WriteIO (lpbyte pbWriteData)	
Description	Write to in- / outputs
Supported product lines	M Line
Parameter	pbWriteData: Pointer to 1 Byte. Each bit corresponds to one in- / output.
Return value	Always TRUE

2.1.9 Bus modules

uint CP3BusModulPointer (uint pSize)	
Description	Read bus module memory size
Supported product lines	S Line M Line
Parameter	pSize: Uint pointer contains size of allocated memory
Return value	Success: Start address of allocated memory Error: NULL

uint CP3SetHalfDuplexMode (bool bOn)	
Description	Half- / full duplex mode
Supported product lines	M Line
Parameter	bOn: 0 = Full duplex; 1 = Half duplex
Return value	Success: TRUE Error: FALSE

bool CP3OEMGetIntNumber (pdword pdwSysIntr)	
Description	Interrupt number of bus module
Supported product lines	M Line
Parameter	pdwSysIntr: Dword pointer contains interrupt number
Return value	Always TRUE

2.2 Examples

2.2.1 System

```
// CP3ReadIds
HardwareAccessMethods.READIDS readIDs;
HardwareAccessMethods.CP3ReadIds(&readIDs);

string GruplaRev = readIDs.GruplaRev.ToString();
string IBRev = readIDs.IBRev.ToString();
string DisplId = readIDs.DisplId.ToString();
string IbsId = readIDs.IbsId.ToString();
string BatOk = readIDs.BatOk.ToString();

// CP3TempHigh, CP3VoltageHighLow
string TempHigh = HardwareAccessMethods.CP3TempHigh().ToString();
string Vin = HardwareAccessMethods.CP3VoltageHighLow().ToString();
```

2.2.2 Memory

```
// CP3GetRamSelection
HardwareAccessMethods.REM_RAM_SEL ramSel;
HardwareAccessMethods.CP3GetRamSelection(&ramSel);
string RamSize = ramSel.dwRamSize.ToString();
string PLCRam = ramSel.dwPLCRam.ToString();
string VisuRam = ramSel.dwVisuRam.ToString();
string ResRam = ramSel.dwReservedRam.ToString();
string PLCSize = ramSel.dwPLCSize.ToString();
string VisuSize = ramSel.dwVisuSize.ToString();
string ResSize = ramSel.dwReservedSize.ToString();

// PLC Pointer + Size
uint Size; uint* pData = HardwareAccessMethods.CP3GetPLCDataPointer(&Size);
if (pData != null)
{
   *pData = 0xa5a5a5a5;
}
string PLCDataSize = Size.ToString();
```

2.2.3 Display

```
private unsafe void numUpDown_Bright_ValChanged(object sender, EventArgs e)
{
   // use NumericUpDown control
   byte bdata = (byte)numUpDown_Bright.Value;
   HardwareAccessMethods.CP3SetBrightness(&bdata);
}
```

SÜTRON electronic GmbH
Kurze Straße 29
D-70794 Filderstadt
Phone: 0049 711 / 77098-0
Fax: 0049 711 / 77098-305
E-Mail: doku@suetron.de
Internet:www.suetron.com